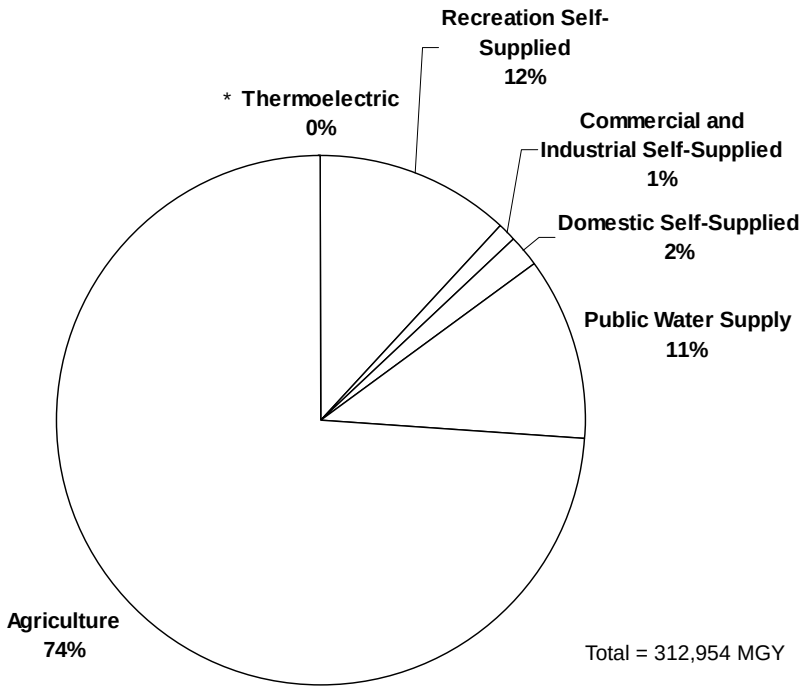
Chapter 6
DEMAND ESTIMATES AND PROJECTIONS

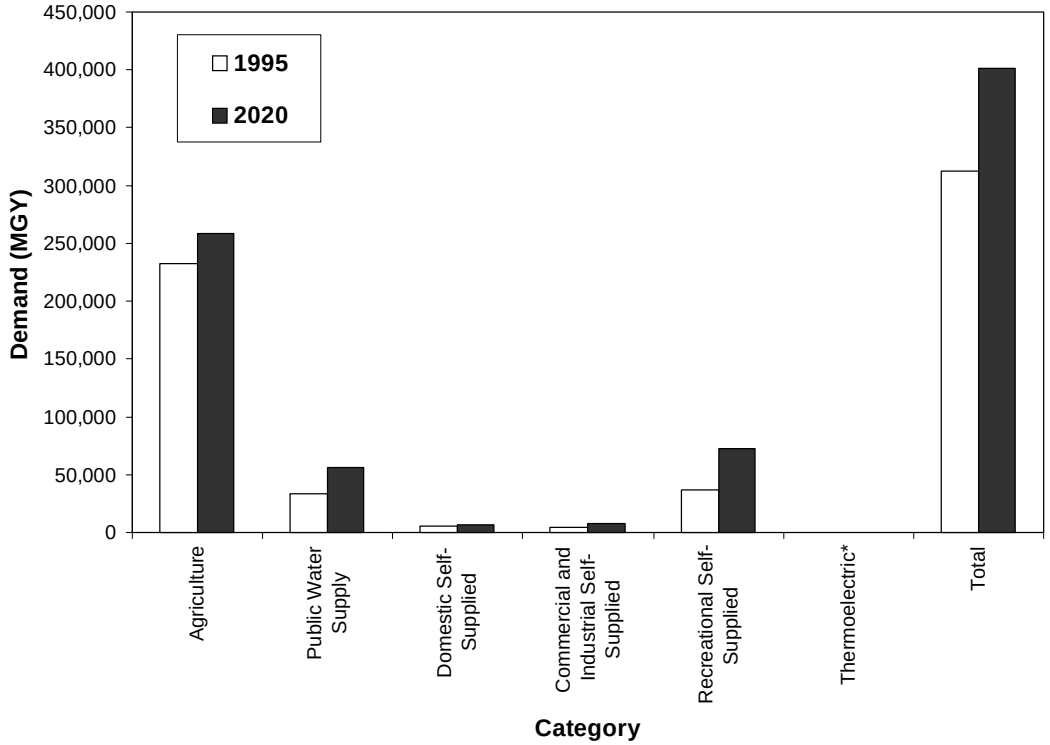
Demand assessments for 1995 and projections for 2020 were obtained from the Districtwide Water Supply Assessment (July 1998), for two major categories of water use, urban and agricultural (**Figure 12**). Urban use is further subdivided into five subcategories: (1) public water supply; (2) domestic self-supplied; (3) commercial and industrial self-supplied; (4) recreation self-supplied; and (5) thermoelectric self-supplied. The subcategory of public water supply refers to all potable water supplied by regional water treatment facilities with pumpage of 0.5 million gallons per day (MGD) or more to all types of customers. The other five subcategories of urban water use are self-supplied. Commercial and industrial refers to operations using over 0.1 MGD. Recreation self-supplied includes landscape and golf course irrigation demand. The landscape subcategory includes water used for parks, cemeteries and other irrigation applications greater than 0.1 MGD. The golf course subcategory includes those operations not supplied by a public water supply or regional reuse facility. Domestic self-supplied is used to designate those households whose primary source of water is private wells and water treatment facilities with pumpages of less than 0.5 MGD. Thermoelectric self-supplied for power generation includes water used by electric power generating facilities for cooling purposes.



*Thermoelectric- 281 MGY in evaporation losses, not circulation cooling demands.

Figure 12. Overall Water Demands for 1995 in the Lower West Coast Planning Area.

Although electric power generation facilities withdraw large amounts of water, virtually all of this water is returned to the hydrologic system near the point of withdrawal. Agriculture includes water used to irrigate crops, cattle watering, and aquaculture. For 1995, the total assessed water demand for the LWC Planning Area was 312,954 million gallons for the year (**Figure 13**).



*281 MGY in evaporation losses, not circulation cooling demands.

Figure 13. Comparison of 1995 and 2020 Water Demands (MGY).

From 1995 to 2020, the total average water demand is projected to increase by 28 percent from 312,954 to 401,548 million gallons per year (MGY), as shown in **Table 13** and **Figure 13**. Recreational self-supplied has the largest projected increase of 94 percent. However, agricultural water demand is projected to remain the single largest category of use. In 1995, agriculture accounted for 74 percent of the total demand. Agricultural demands are projected to increase by 11 percent by 2020, accounting for 64 percent of the total demand in that year.

URBAN WATER DEMAND

Recreation water supply was the largest component (46 percent) of urban water demand in 1995, followed by public water supply (42 percent), domestic self-supplied (6 percent) and commercial and industrial self-supplied (5 percent). Urban water demand in 1995 was estimated to be about 79,913 MGY which is equivalent to 219 MGD; this is

projected to increase to almost 142,761 MGY (391 MGD) in 2020. One-in-ten urban demand in 2020 is projected at 158,222 MGY.

Table 13. Overall Water Demands for 1995 and 2020 (MGY).

Category	Estimated Demands 1995	% of Total	Projected Demands 2020	% of Total	% Change 1995-2020	Projected 1-in-10 Demand 2020
Agriculture	233,041	74	258,787	64	11	306,978
Public Water Supply	33,438	11	56,615	14	69	60,545
Domestic Self-Supplied	4,942	2	6,428	2	30	6,816
Commercial and Industrial Self-Supplied	4,155	1	7,289	2	75	7,289
Recreational Self-Supplied	37,097	12	72,148	18	94	83,591
Thermoelectric	281	0	281	0	0	281
Total	312,954	100	401,548	100	28	465,500

The major driving force behind urban demand is population. Population estimates for 1995 were taken from the U.S. Census. Population projections for the year 2020 were obtained from the Bureau of Economic and Business Research at the University of Florida, adjusted to the portions of the counties within the LWC Planning Area (**Table 14**), and used to develop urban demand projections. The total population of the LWC Planning Area for 1995 was 590,939 and is projected to increase 68 percent to 992,805 in 2020.

Urban demand is projected for the Lee, Collier, Glades, and Hendry county areas. The Charlotte County Area is not included in the urban water demand analysis because the portion of the county within the LWC Planning Area has very small demands for urban uses. Urban demands are concentrated in Lee and Collier counties, with these two counties accounting for approximately 95 percent of the LWC Planning Area urban population.

Public Water Demand

The estimated water demand for PWS and domestic self-supplied users was 38,380 MGY in 1995. These water demands are projected to increase 64 percent from 1995 to 2020 to a total water demand of 63,043 MGY. About 13 percent of the 1995 population were self-supplied and this is projected to be 10 percent in 2020 (**Table 15**). The figures in **Table 15** are presented both in millions of gallons per year (MGY) and

Table 14. Population in the Lower West Coast Planning Area 1995-2020.

County Area	1995			2020		
	Total	Public Water Supplied	Domestic Self-Supplied	Total	Public Water Supplied	Domestic Self-Supplied
Lee	375,238	317,451	57,787	594,300	517,506	76,794
Collier	182,933	158,708	24,225	349,200	322,919	26,281
Hendry	27,714	18,617	9,097	39,999	28,365	11,634
Glades	4,409	2,122	2,287	7,560	3,710	3,850
Charlotte	645	0	645	1,746	0	1,746
LWC Planning Area	590,939	496,898	94,041	992,805	872,500	120,305

millions of gallons per day (MGD). More specific information on utility service area populations and water demands, as well as the methodology used to develop these values is provided in Appendix F.

Table 15. Public Water Supply and Domestic Self-Supplied Demand (MGY/MGD).

County Area	1995				2020				% Change between 1995 and 2020	
	Public Water Supplied		Domestic Self-Supplied		Public Water Supplied		Domestic Self-Supplied			
	MGY	MGD	MGY	MGD	MGY	MGD	MGY	MGD	PWS	DSS
Lee	15,662	42.91	2,197	6.02	24,319	66.63	3,153	8.64	+55	+43
Collier	16,213	44.42	1,971	5.40	29,930	82.00	2,171	5.95	+85	+10
Hendry	1,456	3.99	631	1.73	2,182	5.98	828	2.27	+50	+31
Glades	105	0.29	113	0.31	182	0.50	189	0.52	+72	+68
Charlotte	0	0.00	29	0.08	0	0.00	83	0.23	0	+188
Total	33,437	91.61	4,942	13.54	56,615	155.11	6,427	17.61	+69	+30

Commercial and Industrial Self-Supplied

Commercial and industrial demands supplied by public utilities are included in the PWS demands. The Lee and Collier county areas are the only portions of the LWC Planning Area with reported commercial and industrial self-supplied demands (**Table 16**). Estimates are provided both in terms of millions of gallons per year (MGY) and millions of gallons per day (MGD). The projection methodology for commercial and industrial self-supplied demand is discussed in Appendix F.

Table 16. Commercial and Industrial Self-Supplied Demand (MGY/MGD).

County Area	1995		2020	
	MGY	MGD	MGY	MGD
Lee	1,974	5.40	3,126	8.60
Collier	2,181	6.00	4,163	11.40
Hendry	0	0.00	0	0.00
Glades	0	0.00	0	0.00
Charlotte	0	0.00	0	0.00
Total	4,155	11.4	7,289	20.00

Landscape and Recreational Self-Supplied Demand

Recreational demands supplied by utilities are included in the PWS demands. Demand projections for this section include irrigated acreage permitted for landscaping and recreation, including golf course irrigation, in the LWC Planning Area. Results are presented both in terms of millions of gallons per year (MGY) and millions of gallons per day (MGD). The Collier County Area has the highest demand (**Table 17**). Projection methodology is discussed in Appendix F.

Table 17. Landscape and Recreational Self-Supplied Demand (MGY/MGD).

County Area	1995		2020	
	MGY	MGD	MGY	MGD
Lee	15,370	42.10	27,048	74.00
Collier	21,413	58.70	44,786	122.70
Hendry	281	0.80	281	0.80
Glades	33	0.10	33	0.10
Charlotte	0	0.00	0	0.00
Total	37,097	101.60	72,148	197.70

AGRICULTURAL WATER DEMAND

Summary of Agricultural Demand

There are seven subcategories of agricultural water demand analyzed in this section: (1) citrus; (2) tropical fruit; (3) vegetables; (4) field crops; (5) sod; (6) greenhouse and nursery; and (7) cattle and fish production. Field crops include sugarcane, seed corn, rice, and soybeans. Agricultural water demand was estimated for 1995 to be approximately 233 billion gallons (**Table 13**). Citrus has by far the largest 1995 agricultural water demand (48 percent) and is followed by field crops (31 percent).

Vegetables, sod, and greenhouse/nursery combined account for about 15 percent of agricultural water demand. Tropical fruit production accounts for approximately one percent of agricultural demand. The combined water demand for cattle watering, irrigation of improved pasture, and aquaculture account for less than 0.5 percent of total agricultural demand.

Agricultural water demand is forecast to increase by 11 percent to 258,787 MGY in the year 2020 (**Table 13**). More than half of the agricultural water demand in the year 2020 is anticipated to be for citrus (56 percent) and field crops (28 percent). Vegetables, sod, and greenhouse/nursery combined account for about 14 percent of projected 2020 agricultural water demand. Tropical fruit production accounts for approximately one percent of projected 2020 agricultural demand.

The LWC Planning Area continues to experience growth in irrigated agricultural acreage, especially citrus. The irrigated crops in this region are citrus, sugarcane, vegetables, sod, and greenhouse/nursery. Growth in citrus acreage is usually on land that was formerly pasture. Pasture is seldom irrigated in the LWC Planning Area. When irrigation does take place it is invariably in a period of extreme drought, and is done to prevent the grass from dying. There are, however, some requirements for cattle watering which are associated with the total number of cattle. Descriptions of the agricultural acreage in each county, projection methodology, and the calculation of irrigation requirements and other agricultural water use, including data sources, are detailed in Appendix F.

Agricultural irrigation requirements vary by season, especially for crops such as vegetables that are grown only at specific times of the year. Therefore, agricultural requirements vary by month for each crop in each county, and the summations for the LWC Planning Area are presented as millions of gallons per year and millions of gallons per day. **Figure 14** presents a graphical comparison of agricultural demand by crop type for 1995 and 2020. **Table 18** shows the annual average agricultural irrigation demand by crop.

These projected crop acreages are consistent with the Caloosahatchee Water Management Plan (CWMP). Apparent differences between the plans occur because of differences in geographic extents and the fact that the LWC Water Supply Plan uses net acres while the CWMP uses gross acres. Lands irrigated by ground water are consistent in both plans.

During the public participation process, agricultural interests on the CWMP Advisory Committee indicated that known future projects would result in increases to citrus and sugarcane acreages beyond the historical based acreage projections. As a result, an additional 12,748 acres of citrus and 45,210 acres of sugarcane were incorporated in the analysis for the CWMP. To prevent misrepresentation, gross acreages and net acreages are not combined in the above figure and table (**Figure 14** and **Table 18**).

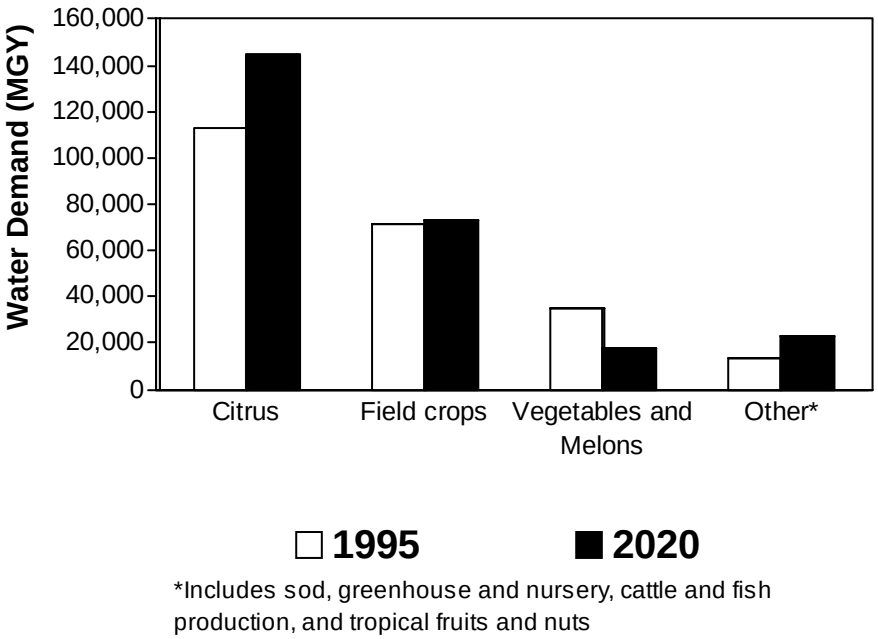


Figure 14. Comparison of 1995 and 2020 Agricultural Demands (MGY).

Table 18. Water Demand (MGY) and Irrigated Acreage by Crop Type[a].

Category	Estimated Demands 1995 (MGY)	Total Irrigated Ac./(head cattle) 1995	Projected Demands 2020 (MGY)	Total Irrigated Ac./ (head cattle) 2020	% Change in Demands 1995-2020	% Change in Acreage 1995-2020	Projected 1-in-10 Demands 2020
Citrus and Citrus Nursery	112,724	128,259	145,206	166,739	29	30	172,339
Tropical Fruit and Nuts	2,103	1,930	3,465	3,180	65	65	4,394
Vegetables and Melons	34,951	44,231	18,103	22,427	-48	-49	20,949
Field Crops	71,707	55,038	72,963	57,122	2	4	86,971
Sod	1,128	650	1,128	650	0	0	1,330
Greenhouse and Nursery	9,610	6,089	17,170	10,627	79	75	20,043
Cattle and Fish Production	818	86,113	752	75,583	-8	-12	752
Total Planning Area	233,041	236,197	258,787	260,745	11	10	306,778

a. Because of differences in units, acreage total excludes cattle and fish production.

Citrus

Citrus is by far the dominant agricultural crop in the LWC Planning Area, and occupies approximately one-half of the irrigated agricultural acreage in the region. Between 1968 and 1980 acreage remained at about the same level. From about 1984 until about 1992, acreage grew rapidly, associated with the inter-regional movement of citrus acreage southward from Central Florida following several severe winter freezes in the mid-1980s. Since approximately 1992, citrus growth has slowed in the area.

Citrus acreage in the LWC Planning Area is projected to grow from 128,259 acres in 1995 to 166,739 acres in 2020. This growth in acreage represents an increase in average irrigation requirements from 112,724 MGY in 1995 to 145,206 MGY in 2020. The 1-in-10 demands estimated for 2020 are 172,339 MGY.

Tropical Fruits and Nuts

Tropical fruits (primarily avocados and mangos) and nuts are produced only in the Lee County portion of the LWC Planning Area. In 1995, there were 1,930 acres of tropical fruits and nuts in Lee County; this acreage is projected to increase to 3,180 acres in 2020. Average irrigation requirements for this acreage are estimated at 2,103 MGY in 1995 and 3,465 MGY in 2020. The projected 2020 1-in-10 irrigation requirement is 4,394 MGY.

Vegetables and Melons

Vegetable crops grown in the LWC Planning Area include cucumbers, peppers, tomatoes, squash, eggplant, watermelons, Latin vegetables, snap beans, and potatoes. There is no significant berry production in the area. Different types of vegetables are often grown interchangeably, and in 1995 there were 44,231 acres of land used for vegetable production. This is projected to decrease to 22,427 acres in 2020. The average irrigation requirement for vegetable crops is 34,951 MGY in 1995 and 18,103 MGY in 2020. The 1-in-10 irrigation requirement for the 2020 vegetable acreage is 20,949 MGY.

FIELD CROPS

Sugarcane

Hendry and Glades county areas are the only parts of the LWC Planning Area where sugarcane is produced. As a result of the cultivation practices used for sugarcane (ratoon and fallow), 25 percent of the land used for sugarcane production is fallow in any given year. This fallow land does not require irrigation and is not included in the demand projections presented here.

In 1995, a total of 35,443 acres of sugarcane were produced in the Hendry County Area, with an average irrigation requirement of 46,616 MGY. The historical projection of

acreage and irrigation demand is to remain relatively constant through 2020. The 1-in-10 irrigation requirement for 2020 is 56,466 MGY.

Sugarcane acreage in the Glades County Area is also projected to remain constant at 16,295 acres through 2020. The associated acreage irrigation requirement is 23,134 MGY. The 1-in-10 irrigation requirement for 2020 is 27,710 MGY.

Other Field Crops

The seed corn production in southeastern Charlotte County varies from year to year, based primarily on the demand for seed corn, which in turn is dependent on seed corn production in other parts of the country. This variation in production is more a fluctuation than a trend. The estimate for seed corn production is 2,100 acres and 1,000 acres for soybeans. While fluctuations are anticipated, the magnitude of this acreage is typical. These combined acreages have average irrigation requirements of 1,782 MGY, and 1-in-10 year drought irrigation requirements of 2,020 MGY.

Rice in southern Glades County is grown during the summer months in rotation with sugarcane or winter vegetables, and takes place on land that would otherwise be fallow. Rice acreage in southern Glades County was assessed at 200 acres in 1995, and is projected to increase to 800 acres by 2020. Average demands are 175 MGY for 1995 and 699 MGY for 2020. The 1-in-10 demands in 2020 are 775 MGY.

Sod

In 1995, there were a total of 650 acres of irrigated sod production in the LWC Planning Area. There is additional sod harvested from pastureland, but this is rarely irrigated. Sod production is projected to remain fairly constant through 2020, with an associated average irrigation requirement of 1,128 MGY in both 1995 and 2020. The 1-in-10 irrigation requirement for sod for 2020 is estimated at 1,330 MGY.

Greenhouse and Nursery

In 1995, there were 6,089 acres of greenhouse/nursery operations in the LWC Planning Area, and this is projected to increase to 10,627 acres by the year 2020. Average demands by greenhouse/nurseries in the LWC Planning Area are projected to increase from 9,610 MGY in 1995 to 17,170 MGY in 2020. The 1-in-10 irrigation requirement associated with the projected 2020 acreage is 20,043 MGY.

Cattle and Fish Production

Demand for cattle watering and barn washing is associated with cattle production (which is in turn associated with pasture acreage). However, these demand results are somewhat conservative since range cattle are also included in the calculations. Aquaculture, associated with fish production is only located in Collier County. Combined

cattle and fish production was assessed at 818 MGY in 1995, and is projected to decline slightly to 752 MGY in 2020. This decline is related to the displacement of pastureland by other agricultural or urban land uses.